the late Rev. J. O. Dorsey. They honored his personal character and his conscientious efforts, and preferred silence to the unwelcome task of pointing out the numerous errors throughout his work when he was no longer living to rectify them. Had Mr. Dorsey continued the study of the Omaha language and so perfected his knowledge of it he would have been better able to understand the meaning of the institutions and ideals of the tribe as they were explained to him in the native tongue. Regrettably his imperfect knowledge of the language, as can readily be seen in his Omaha texts, accounts for misconceptions that now appear in his writings.

It is with regret that the authors are now obliged to break the silence which they would have preferred to maintain. The misconceptions of Mr. Dorsey, cited by the reviewer, they corrected in the interest of truth, but without caring to detract from the credit due to the deserving author. Their competency to do so comes from the long and careful study of the tribal institutions and the beliefs on which they were founded, made in conjunction with practically all those men of the tribe who by position and ability were qualified to explain and to interpret tribal life and thought, and also to point out the differences between teachings that were to be taken literally and those which were symbolic in form and character.

The unusual advantages under which the monograph was prepared are indicated in the foreword (p. 30). One of the authors is not only himself an Omaha and well versed in his native language, but is equipped with a knowledge of English, so that niceties of the meaning and of the usage of words are made clear. In consequence of these facts and conditions it was in the power of the authors to state that among the Omaha tribe there was no belief that the ancestors of the people were animals and that at death men returned to the animals from which they sprang.

It would take too much space to reply to all the animadversions and innuendos of the would-be reviewer, nor would any good purpose thereby be served.

FRANCIS LA FLESCHE

SCIENTIFIC BOOKS

Éloges académiques et divers. Volume publié par le comité du jubilé scientifique de M. Gaston Darboux. By GASTON DARBOUX. Paris, A. Hermann & Fils. 1912. Pp. 525 + 4 + portrait. Price, 5 francs.

Jean Gaston Darboux, most eminent of living geometers, was born at Nîmes, France, April 13, 1842. His scientific career may be said to have begun with his entry into the École Normale Supérieure in 1861. To commemorate the fiftieth anniversary of this event[1] it was proposed early in 1911, by a large international group of his mathematical coworkers, friends and former pupils (Professor Hale, of Mount Wilson Observatory, and Professor Hancock, of Cincinnati, were the American representatives), to present to Professor Darboux a gold medal bearing his portrait, and an appropriate address signed by the participants. All mathematicians were invited to share in rendering this honor to Professor Darboux. The response was so generous, the committee was enabled not only to have the eminent artist M. Vernon execute the medal but also to publish a memorial volume. This volume contains a full report of the commemoration proceedings which took place at the Sorbonne, January 21, 1912; Lippmann, Appell, Poincaré, Picard, Volterra, were among the speakers. It also contains 6 éloges historiques (pages 1–306) which Darboux as secrétaire perpetuel delivered before the Academy of Sciences of the Institut after his election in 1900. And finally, we find a dozen of his miscellaneous addresses (pages 307–440) among which mention may be made of that on "The Unity of Science," delivered at St. Louis in 1904, and that on "Fulton and the Academy of Science," delivered in 1909.

The volume is of particular interest to the scientist because of the most attractive style

[1] Curiously enough the letter sent out by the international committee stated that the jubilee of service as a teacher in the system of public instruction in France was to be celebrated. This error is perpetuated on page 443 of the memorial volume to be presently referred to. As a matter of fact, Darboux is even now a year or so short of such a period of service.

of the éloges historiques here collected with annotations from volumes of the *Mémoires de l'Académie des Sciences de l'Institut de France*. Nowhere else are such extended accounts of the scientific careers of Bertrand (pages 1–60), Perrier (pages 61–115), Hermite (pages 116–172), D'Abbadie (pages 173–217), and Meusnier (pages 218–262) to be found.

Joseph Louis François Bertrand (1822–1900) was one of that remarkable group of mathematicians—among them, Poinsot, Poisson, Cauchy, Poncelet, Chasles, Lamé, Le Verrier, Liouville, Halphen, Hermite, Poincaré—who were, at least in part, the product of instruction at the École Polytechnique. A child prodigy and boy not to be bound down by the ordinary routine of the lycée he was nevertheless bachelier, licenciée and docteur ès science when 17 years of age—the youngest doctor of science whom France has ever produced. He then took the entrance examinations for the École Polytechnique. Bertrand has left us some details; Bourdon and Auguste Comte were the examiners:

> J'ai le souvenir de l'étonnement de M. Bourdon qui, sachant que j'étais docteur ès sciences, m'avait fait un examen difficile. A la suite de je ne sais quelle réponse, il me dit: "Vous n'avez donc jamais onvert une table de logarithmes?—Je lui répondis: Non, Monsieur, jamais." Il prit cela pour une impertinence; c'était la pure verité. Je n'avais fait aucun, devoir scientifique ou littéraire, jamais aucun calcul demandé par aucun maître.

Bertrand then continues:

> A l'École Polytechnique, j'étais un problème pour mes camarades. Reçu le premier et gardaut le premier rang dans toutes les épreuves, je les étonnais de temps en temps par une ignorance scandaleuse sur des notions qu'on enseigne en septième. Beaucoup d'entre eux croyaient à une ignorance affectée; j'en étais très haiteux au contraire. J'ignorais complètement, par example, quelle sorte de mots les grammairiens désignent par le terme d'adverbes.

Bertrand became "répétiteur adjoint d'analyse" at the École Polytechnique in 1844 and professor of analysis in 1856. This position he held till, by reason of the legal age limit, he was retired in 1895, after 51 years of service. On Bertrand, as well as on Poincaré in more recent times, was bestowed the supreme honor which France has in her gift for the élite of her scientists, namely, of election to both the Académie des Sciences (1856) and the Académie Français (1884) of the Institut.

For an account of Bertrand's researches in geometry, analysis, rational mechanics and physics, and of his text-books so popular in secondary education, reference must be made to Darboux's memoir. One may here also find a sketch of his family life and of his personal characteristics.

François Perrier (1833–1888), another graduate of the École Polytechnique, was employed for nearly a score of years by the general army staff, before he became a chief of the geodetic survey and professor of geodesy in the Ecole de Guerre, Paris. His extensive scientific work was in the field of geodesy.

Charles Hermite (1822–1901) at the time of his death was ranked first among French mathematicians. It was in connection with algebra and arithmetic that he was essentially inventor and creator; most notable were his contributions to elliptic and Abelian functions, algebraic forms and the theory of numbers. Through his proof of the transcendence of e he may well share with Lindemann (who employed very similar methods in discussing the transcendence of π) the honor of settling the problem of the squaring of the circle, which had been handed down through the centuries. All these topics and Hermite's career, as professor at the École Polytechnique and at the Sorbonne, as academician, as friend of mathematicians scattered all over the world—are treated at length by Darboux.[2]

Antoine Thompson d'Abbadie (1810–1897)

[2] Disciples of Francis Galton will surely find material of interest in studying hereditary traits of the families of some French mathematicians. For Bertrand was a nephew of Duhamel. Emile Picard and Paul Appell are nephews (the latter by marriage) of Bertrand. Pierre Boutroux is a nephew of Poincaré. Picard's wife was Hermite's daughter and Borel married a daughter of Appell.

was by birth an Irishman. His father, who was descended from an ancient French family, left his native land just before the Revolution and emigrated to Ireland, where he married a Miss Thompson. About 1820 they returned to France with their six children who had been born in Ireland. Two of the children, the brothers, Antoine and Arnaud, became scientists and performed much of their scientific exploration together in Abyssinia and Ethiopia. Antoine was chief of the Venus expedition to Hayti in 1882. Exploration, seismology, geodesy, meteorology, astronomy, claimed his attention at different periods of his life. His principal published work was the monumental "Geodésie de la haute Ethiope" (1873), which appeared shortly after his election to the Academy of Sciences.

General Jean Baptiste Marie Charles Meusnier de Laplace was born at Tours in 1754, and died at Mayence in 1793, as the result of wounds received in battle. Although thus cut off at the early age of 39 "il laissait" to quote the words of one of his friends, "des traces brillantes d'un intelligence d'élite secondée par un zèle infatigable."

His single memoir in pure mathematics was written just as he was leaving the École Polytechnique and contains a complete theory of the curvature of surfaces[3] from an entirely different point of view from that which Euler illuminated in 1763.[4] When Meusnier's memoir was presented to the Institut in 1776 it created a sensation (d'Alembert exclaimed, "Meusnier commence comme je finis"); and although only 22 years of age he was immediately elected a correspondent of the Academy of Sciences. While connected with the army during the next few years, Meusnier constructed a machine for the distillation of sea water and the extraordinary results, in connection with both the theory and practise of aerostation, which he presented to the Academy in 1784, brought about his election as academician.

It was in 1783 that Lavoisier and Laplace maintained before the Institut that the "element" water was formed by the combustion of hydrogen in oxygen. But some doubt existed as to the conclusions. This doubt was forever removed a year later, through experiment inspired by the genius of Meusnier. The subject was presented to the Academy in a "Mémoire . . . par MM. Meusnier et Lavoisier."

R. C. ARCHIBALD

BROWN UNIVERSITY,
PROVIDENCE, R. I.

Color Standards and Nomenclature. By ROBERT RIDGWAY, M.S., C.M.Z.S., etc.; Curator of the Division of Birds, U. S. National Museum. Pp. iii + 44, with 53 plates containing illustrations of 1,115 named colors, and providing a system of nomenclature permitting the definite location and designation of over 4,000 colors. Published by the author, Washington, D. C. Press work by A. Hoen & Co., Baltimore.

This work is a conspicuous example of that devotion to science which has led a few men to give the better part of their lives to the accomplishment of some important task, their hope of reward being little more than the satisfaction of having finished a work that will serve to advance science, and thus contribute to the welfare of mankind. More than twenty years ago the author began the attempt to supply a practical means of identifying the color of natural objects, so that this important property of these objects might be used with some degree of precision in identifying them. The task has been an enormous one, involving much pioneering in a little understood field of science. Many important problems had to be solved before the work

[3] "Mémoire sur la courbune des Surfaces," *Savants étrangers*, t. X., 1785, pp. 477–510. It is this memoir which contains the famous theorem concerning the curvature of oblique sections of surfaces, with which Meusnier's name is always associated. English writers and the American historian Cajori incorrectly write Meusnier's name without the *s*.

[4] "Recherches sur la courbune des Surfaces," *Mémoires de l'Acad. d. sc. de Berlin*, [t. XVI.] (1760), 1767, pp. 119–143 + 2 Taf. A memoir with this title was presented to the academy by C. G. J. Jacobi on September 8, 1763.